THE CHESAPEAKE BAY IMPACT CRATER: AN UPDATE. C. Wylie Poag, Deborah R. Hutchinson, and Steven M. Colman, U.S. Geological Survey, 384 Woods Hole Rd., Woods Hole, MA 02543-1598, wpoag@usgs.gov.

More than 1200 km of seismic reflection profiles reveal the principal structural and depositional features of the late Eocene Chesapeake Bay impact crater. The latest addition to the seismic data base, collected by the USGS and National Geographic Society in April, 1996, allows significant revision of earlier interpretations. New profiles across the crater's eastern sector confirm that the outer rim is nearly circular in gross form (approximately 85 km in diameter), but in detail, the rim displays an irregular, blocky, peripheral outline. Distinct peripheral bulges to the northwest and southeast, are possible evidence of a low-angle bolide trajectory. Concentric normal faults are prominent at several locations a few kilometers outside the crater rim. Rotational megaslump blocks, two or more kilometers in maximum dimension, are common in the preimpact sedimentary section of the annular trough, particularly adjacent to the outer rim escarpment. Crystalline basement rocks form the floor of the annular trough, and display an irregular to smooth surface beneath the megaslump blocks. On one profile, the basement surface bends abruptly downward directly beneath the outer rim escarpment. An ovate inner basin, approximately 30 km in maximum diameter, is rimmed by a peak ring of approximately 200 m maximum structural relief. The floor of the inner basin has not been imaged, but is at least 1.3 km deep. One profile, near the center of the crater, appears to have imaged a small central peak. The presence of this peak also is suggested by a relative gravity high within the circular negative anomaly that marks the inner basin. The annular trough and inner basin are filled (or partly filled) with the Exmore breccia, which has been cored to a depth of 60 m. The seismic expression of the breccia within the inner basin suggests division into an upper layer (400-600 m thick) and a lower layer (600-1000? m thick). The upper layer, which has been partly cored, contains sparse crystalline clasts. By analogy with other terrestrial impact deposits, we expect the lower layer, which has not been cored, to be dominated by crystalline clasts. The Exmore breccia also extends outside the crater rim as an ejecta blanket, and there its total thickness (~20 m) has been cored at two sites.The principal interior structures (in crystalline basement) of the Chesapeake Bay crater also are expressed in the structure and thickness of the overlying breccia and of the postimpact sedimentary section. In particular, both the breccia and the postimpact section are notably thinner and structurally raised where they cross the peak ring and central peak. The collective geophysical and geological data indicate that the Chesapeake Bay crater is one of the best preserved complex peak-ring structures documented on Earth.